Personal Electronic Anxiety Control and Education Device

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INTRODUCTION

Background:

- Up to 33.7% of population is affected by anxiety disorder in lifetime[1]
- 80% of people with anxiety do not seek treatment[2]
- Recurring symptoms negatively impacts life and increases risk of mortality and morbidity[3]

Problem:

- Current anxiety treatment is expensive and inaccessible
  - Average cost of therapy in the U.S.: $100-$200+ per session[4]
  - Average cost of antidepressants for 30 day supply: $10-$130 generic brand, $200-500+ brand-name[5]
- No current technology exists that actively detects onset symptoms for mitigation by prevention

Need Statement:

An accessible and affordable way to effectively track and predict physiological symptoms of anxiety in young adults in order to increase self-awareness and mitigate these symptoms.

MANUFACTURING COST, MARKET ANALYSIS, PATENT, REIMBURSEMENT

Manufacturing:

	Parts Cost	Labor Cost	Total Cost/unit
Start-up*	$193.71	$335.25	$528.96
Large Scale	$59.92	$23.75	$83.67

*includes R&D

Retail:

	Price/unit	Subscription/week*	Total Cost
PEACE	$120.00	$0.00	$120.00
Feel Emotion Sensor	$199.99	$50.00	$399.99

*estimated subscription duration is 4 weeks

Patentability:

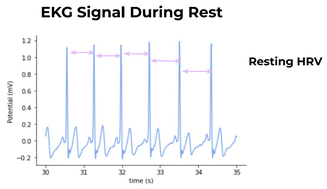
- Our device is similar to 3 patents on market
  - cognitive state alteration system[6]
  - physiological monitoring garments[7]
  - unobtrusive emotion recognition system[8]
- Novelty is the anxiety-specific detection & symptom mitigation by prediction

Reimbursement:

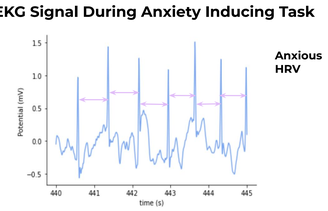
- Likely not reimbursable by Medicare/Medicaid[9,10]
- Low upfront cost and high durability will still allow for an affordable and accessible product

COLLECTED DATA

EKG Signal During Rest



EKG Signal During Anxiety Inducing Task



EDA Throughout the Entire Experiment

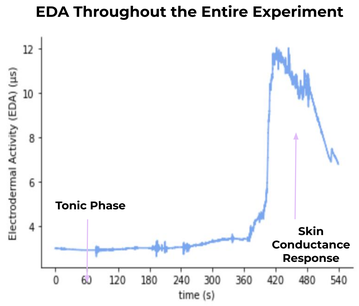
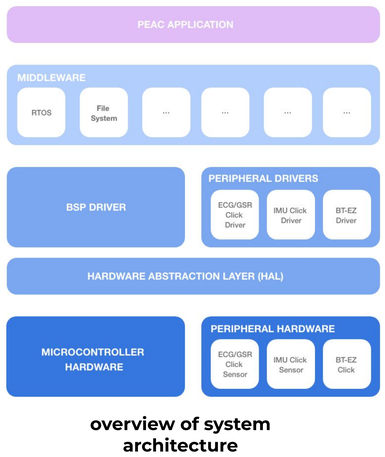


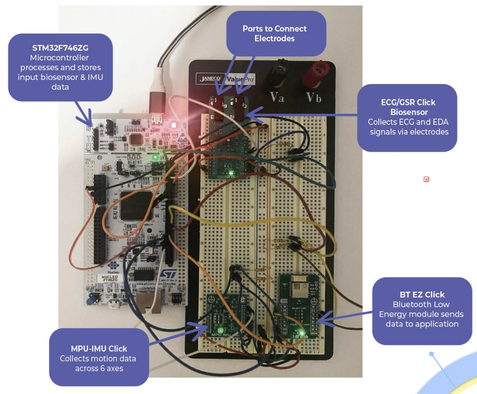
Figure A. Typical EKG signal for a subject during rest.
Figure B. Typical EKG signal for a subject during a stressful task (i.e. Stroop test, public speaking).
Figure C. Overview of the EDA signal for a subject during data acquisition, including the resting phase and stress inducing task phase.

PROPOSED SOLUTION

Hardware:

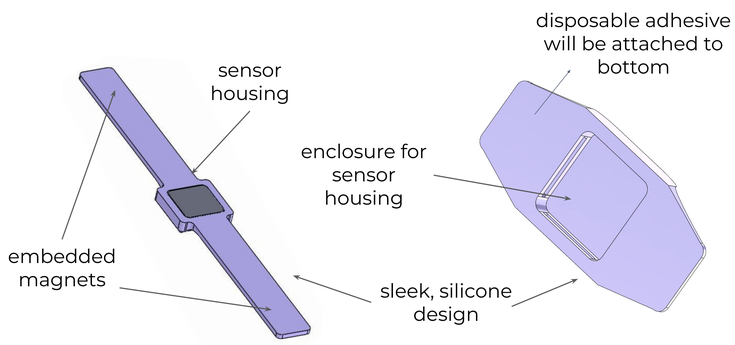


overview of system architecture



Final Hardware Prototype

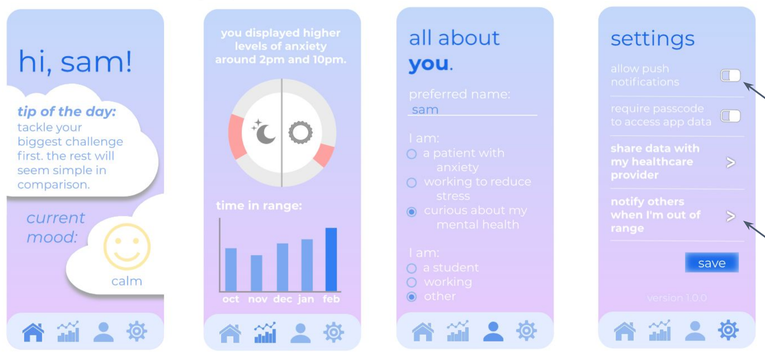
Wearable: Wrist Band & Patch



Mobile Application

data displayed in graphs + charts

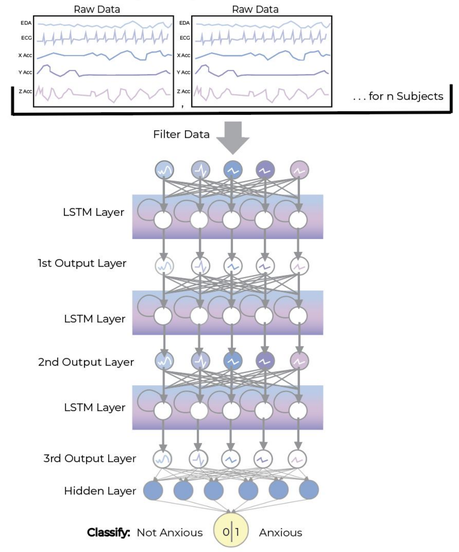
customizable to user



optional notifications provide help during anxiety attacks

ability to share data with healthcare provider & loved ones

Machine Learning Algorithm:



CONCLUSIONS

- This product allows users to take control of their mental health at a more affordable price than the competitors
- It targets anxiety and promotes a stress-free state of mind in order to aid in the overall well-being of each individual
- Model Prediction Analysis
  - Accuracy in identifying anxiety versus other emotional states
  - Minimizes false positives

Future Work

- A major aim is to fine tune and improve the machine learning algorithm with additional data and ensure that the algorithm will be personalized for a user.

Limitations

- Difficult to acquire sufficient data to train the algorithm due to volunteer scheduling and limited potential subject pool.

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